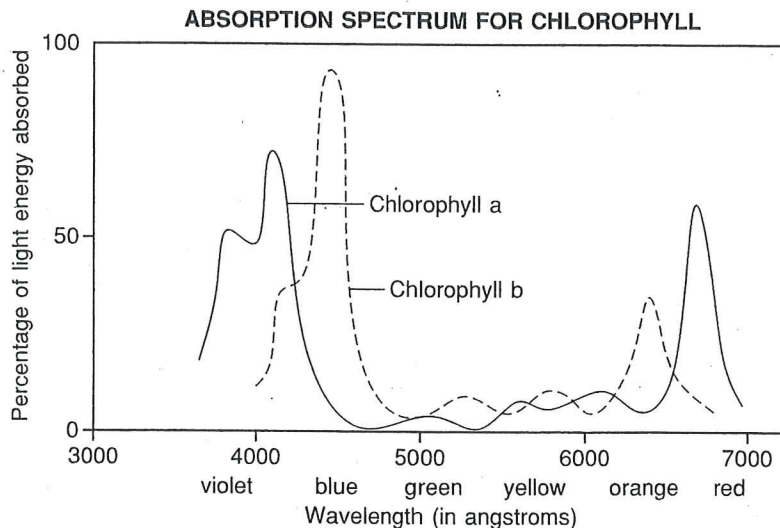


The Absorption of Chlorophyll

A pigment is a substance that absorbs and reflects light of particular wavelengths. For example, the yellow-green color of a leaf is due to a pigment in the leaf called chlorophyll. When white light (which contains all of the colors of the spectrum) shines on chlorophyll, the chlorophyll absorbs most of the red, orange, blue, and violet and reflects most of the green and yellow. That is why you see a yellow-green color. Think of a pigment as a sponge that soaks up all of the other colors of the spectrum except the one you see.

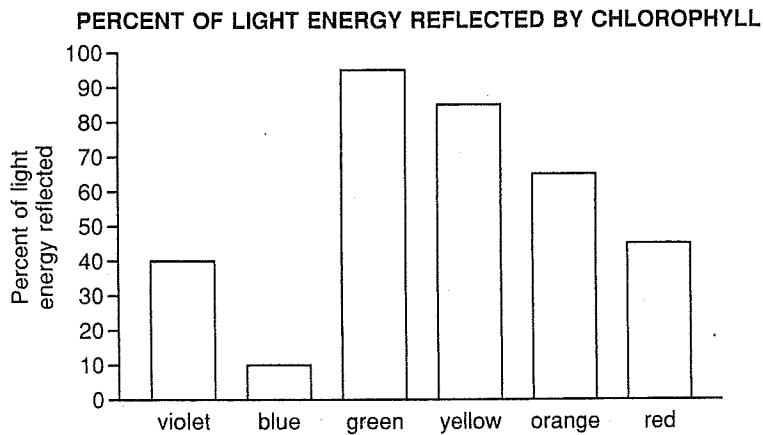
A spectrophotometer is an instrument that is used to measure the amount of light absorbed by a pigment. Below is a graph showing the percentage of light energy reflected for the absorption spectrum for chlorophyll. The highest peaks represent colors that chlorophyll absorbs the most. Therefore, they are the least visible.



Use the above graph to answer the following questions.

1. Which of the colors absorbed by chlorophyll is least visible? _____
2. What is its approximate wavelength? _____
3. What percentage of light energy absorbed does this peak represent? _____
4. How much of this color is being reflected? _____
5. What percentage of light energy absorbed by chlorophyll does the orange spectrum peak represent? _____

6. Why would you say there are no peaks in the range between 5000 angstroms and 6100 angstroms? _____
7. Are you able to see the light in the yellow-green part of the spectrum? Explain why. _____
8. Arrange the colors in the absorption spectrum of chlorophyll in order of their visibility. Place the most visible color first. _____



Use the bar graph, which shows the percentage of light energy reflected by chlorophyll, to answer the following questions. The graph was derived from the chlorophyll absorption spectrum.

9. Which color in this spectrum is most visible? _____
10. What is the approximate percentage of light energy reflected for this color? _____
11. What percentage of light energy absorbed does this represent? _____
12. If everything above 50 percent of light energy reflected is visible to the human eye, is red light part of the mixture of colors seen in light reflected by chlorophyll? _____

Chapter 8 Photosynthesis

Section Review 8-2

Reviewing Key Concepts

Matching Match each scientist with the appropriate experiment or conclusion. Write the letter of the correct scientist on the line provided. A letter may be used more than once.

- a. Priestley b. van Helmont c. Ingenhousz

- _____ 1. Plants need sunlight to produce oxygen.
- _____ 2. Plants gain most of their mass by taking in water.
- _____ 3. Using a candle and a jar, he observed that plants produce a substance that kept the candle burning.
- _____ 4. He measured the mass of the soil in which a plant grew.
- _____ 5. He observed plants exposed to light.

Short Answer On the lines provided, answer the following questions.

6. What is the overall equation for photosynthesis?

7. Explain how light energy affects a chlorophyll molecule.

Reviewing Key Skills

8. **Predicting** If a plant is kept under green-colored light for an extended period of time, what will happen to the plant's food production?

9. **Inferring** A plant that has a high amount of the orange pigment carotene would have leaves of what color? Explain your answer.

10. **Design an Experiment** Design an experiment to test the effects of air pollution on plants. Be sure to include a control.

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